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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,563	11/28/2003	Naoki Yoshimura	PTGF-03095	6265
21254	7590	07/27/2005	EXAMINER	
MCGINN & GIBB, PLLC 8321 OLD COURTHOUSE ROAD SUITE 200 VIENNA, VA 22182-3817			MONDT, JOHANNES P	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/722,563

Applicant(s)

YOSHIMURA ET AL.

Examiner

Johannes P. Mondt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 14-16 and 18-26 is/are rejected.
- 7) ☒ Claim(s) 12, 13 and 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

Amendment filed 5/6/05 forms the basis of this office action. In said Amendment Applicants amended all claims through amendment of claims 1-17, 19-23, 25 and 26. Comments on Remarks in said Amendment are included below under "Response to Arguments".

Response to Arguments

1. Applicant's arguments filed 5/6/05 have been fully considered but they are not persuasive. In particular,

(A) Applicants' argument in traverse of the rejection under 35 U.S.C. 103(a) of claims 1, 3 and 14 over Ellens et al is *not persuasive* because:

(a) Ellens et al clearly teach a light emitting element with an emission wavelength in a range that *comprises* the range as claimed (see Figures 3-5, wherefrom it is evident that the sub-range claimed is comprised in the range taught by Ellens et al), and

(b) nothing in the specification (including the drawings) nor in the claim language explains as critical to the invention that that particular portion of the range taught by Ellens et al that is not contained in the range as claimed should not be part of the emission spectrum. Therefore, counter to Applicants' allegation that in contrast to Ellens et al, "Applicants have recognized that the narrower range of wavelengths defined by independent claims 1 and 14 in combination with the remaining claim limitations, provide an improvement" in the specific colors while "Ellens et al cannot be reasonably considered as recognizing the criticality of this narrower range of wavelengths" is

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defective because nothing in the specification indicates the criticality of the absence of the sub-spectra 300 – 360 nm and 550-560 nm, nor is said absence claimed.

(B) Applicants' argument in traverse of the rejection under 35 USC 103(a) of claim 6 over Ellens et al is *not persuasive* because:

Applicants explain the chemical expression on line 4 of claim 6 on page 18, lines 8-15, of the specification to mean that metal Me is "being replaced by Re1 or by Re1 and Re2, from which the value $z=0$ is allowed in view of the specification unless specifically excluded in the claim, which it is not. Therefore Applicants' argument that the in Ellens et al "there is no suggestion that the narrower definition of this formula has been enabled" (i.e., formula on line 4o of claim 6) is based on the incorrect premise that said narrower definition is claimed.

(C) Applicants' argument in traverse of the rejection of claim 16 under 35 U.S.C. 103(a) over Ellens et al is *not persuasive* because, counter to Applicants' allegation, examiner did not add $x=0.5$ but only noted for definiteness the presence of the composition characterized by $x=0.5$ in both $LaSi_3N_5:Ce$ in Ellens et al and in the claimed composition $La_{1-x}Si_3N_5:xCe$, said expression $LaSi_3N_5:Ce$ having a meaning in the art of partial or complete substitution of La by Ce depending on the context. See, for instance, Ellens et al (loc.cit.), col. 1, l. 53-67), which corresponds exactly to the role of Ce as substituting for, i.e., replacing, La in Applicants' specification (see page 18, lines 8-15).

(D) Applicants' argument in traverse of the rejection under 35 U.S.C. 103(a) of claims 19-26 appears based on a difference in concept while the only issue with regard

to the claim language is whether or not Lebens teach "turning on intermittently the light emitting element", which is clearly the case, as witnessed by the cited portion: see, for instance the circuit of Figure 7 recited in col. 13, l. 28, by which pulsed (col. 12, l. 10) and otherwise, through feedback (col. 13, l. 28), time-dependent current is fed to the light-emitting apparatus; see also col. 12, l. 5-24) as a description of the operation of the circuit of Figure 7.

Therefore, none of the arguments in traverse of the art rejections have been deemed persuasive.

With regard to the traverse of the rejections of claims 6-8 under 35 U.S.C. 112, second paragraph, the cited portion of the MPEP does not relate to the issue at hand, which is not whether or not a structure is not presented or because a partial structure is presented, but instead the issue is whether or not a particular structure is included or not. In particular, and only by example: on the one hand the phosphor appears to comprise Re2 by virtue of line 4, but on the other hand metal (Me) is said to be replaced either by Re1 or by both Re1 and Re2 (see lines 5-9), in the former case no Re2 being present, as inherently Re2 when present does replace Me because of its valence.

The rejection under 35 USC 112, second paragraph has been withdrawn in light of Applicants' traverse: clearly the brackets in claim 13 designate entities that are indeed necessarily present in the chemical substance denoted in lines 4 and 5.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 6-8** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 6, and through their dependence on claim 6, claims 7-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite through the omission of essential elements, such omission amounting to a gap between the elements. The omitted elements are caused by the entirely undefined and undetermined ranges for at least one of the variables x, y, z, m and n, rendering the claim limitations of lines 3-10 of claim 6 implausible. See MPEP § 2172.01.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1-11, 14-16 and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellens et al (6,670,748 B2). With regard to claims 6-8 this rejection is offered subject to the aforementioned indefiniteness of claims 6-8 and to the best of understanding of the examiner.

On claims 1, 3 and 14: *Ellens et al* teach a light emitting apparatus comprising: a light emitting element (cf. title and abstract) with an emission wavelength in a range of

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300 to 570 nm, hence a range overlapping the range as claimed, i.e., 360 to 550 nm (cf. abstract); and

a rare-earth element doped oxide nitride phosphor (cf. col. 1, l. 39 – col. 4, l. 5, for instance col. 3, l. 59-64, the rare-earth element being Eu (also at least Ce (thus meeting claim 14), Lu, La, Gd), and including an α -sialon (cf. col. 1, l. 28-36 and col. 3, l. 59-64) (thus meeting the further limitation of claim 3);

wherein a part of the light radiated from the light emitting element is wavelength-converted by the phosphor to the wavelength range with peak emission at 430 to 670 nm for example: see abstract; thus resulting in a mixture of wavelength-converted light and another part of light (the originally emitted light. In conclusion, Ellens et al teach all limitations except possibly the range for the emission wavelength of the LED, said range seen to overlap the range taught by the prior art. Applicant is reminded that a *prima facie* case of obviousness typically exists when the ranges as claimed overlap the ranges disclosed in the prior art or when the ranges do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties. In re Peterson, 65 USPQ2d 1379 (CA FC 2003).

On claim 2: the emission wavelength range of the aforementioned mixture of phosphor-converted light and originally emitted light as claimed, 450 – 550 nm, overlaps the range in the prior art (300-570 nm). Applicant is reminded that a *prima facie* case of obviousness typically exists when the ranges as claimed overlap the ranges disclosed in the prior art or when the ranges do not overlap but are close enough such that one

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skilled in the art would have expected them to have the same properties. In re Peterson, 65 USPQ2d 1379 (CA FC 2003).

On claim 4: the phosphor comprises a powder 6 or particles (cf. col. 7, l. 50-60) and is contained in a light transmitting material 5 (Figure 1 and col. 6, l. 55 – col. 7, l. 7).

On claim 5: the light emitting element comprises a III Group (Group III, i.e.) nitride system compound semiconductor emitting element (InGaN: cf. col. 6, l. 56-64).

On claims 6 and 11: the alpha sialon phosphor by Ellens et al is $\text{Me}_x\text{Si}_{12-(m+n)}\text{Al}_{(m+n)}\text{O}_n\text{N}_{16-n}:\text{Re1}_y\text{Re2}_z$, with part or all of metal Me (=one or more of Li, Ca, Mg, Y and lanthanide metals except La and Ce replaced by lanthanide metal Re1 comprises one or more of Ce, Pr, Eu, Tb, Yb, and Er as a luminescence center, or replaced by lanthanide metal Re1 and lanthanide metal (Re2), where Re2 comprises Dy, which inherently is a co-activator. In particular the claim is met for $\text{M}_{p/2}\text{Si}_{12-(p+q)}\text{Al}_{p+q}\text{O}_q\text{N}_{16-q}:\text{Eu}^{2+}$ (cf. col. 3, l. 59-64, Table 2, col. 5, l. 29- col. 6, l. 28 and col. 8, l. 34-53) and the selections $x=p/2$, $n=q$, $p=m$, the selection Ca (thus meeting claim 11) for metal Me, the selection of Eu for Re1, considering Re2 need not be present. For example, specifically note $\text{Ca}_{0.68}\text{Si}_{10}\text{Al}_2\text{N}_{15.3}\text{O}_{0.7}:\text{Eu}^{2+}$ which meets the claim through the selections of Ca for Me, $x=0.68$, $m+n=2$, $n=0.7$, $m=1.3$, and Re1=Eu and Re2 absent. It is furthermore noted that the chemical expression merely defines α -sialon when doped with Re1 or and/or Re2 while Applicants' specification (page 18, lines 8-15) only recites "Part or all of metal (Me)...is replaced by lanthanide metal (Re1)...or lanthanide metal (Re1) and lanthanide metal (Re2) (Re2 is Dy)...", while the ranges of the stoichiometric parameters in the

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chemical expression on line 4 of claim 6 is not otherwise defined in the claimed subject matter nor in the specification.

On claim 7: the metal $Me=Ca$ (Ca is bivalent, being in Group IIA of the periodic system and having two electrons in the outer shell) and the values $m=1.3$ and $n=0.7$ discussed above under claim 6 meet the further limitation of this claim.

On claim 8: the further limitation of claim 8 is met by $MSi_5Al_2ON_9: Eu^{2+}$ (col. 8, l. 34-53) where M is one of the trivalent elements Lu, La, Gd or Y, $m=1.98$ and $n=1.45$ ($12-(m+n)=2.5(m+n)$ so as to have the correct ratio between the Si and Al, and $16-n=9n$ so as to have the correct ratio between O and N). Note that only ratios of stoichiometric parameters matter considering the powder form of the substance.

On claims 9 and 10: Ellens et al do not necessarily teach the further limitation as defined by claim 9, nor as defined by claim 10, although the ranges for q and p for YO sialon do comprise the claimed composition for the following values solidly contained in the taught range defining the YO sialon: $q=0.75$ and $p=1.5$. However, despite the point-like nature of said limitation with regard to the required ratios of Si, Al, O and N Applicants do not at all disclose in their Specification, at least not within the context of elected Species 1, why said claimed range is critical to their invention. Applicant's disclosure does not teach why the range as claimed is critical to the invention, in particular not why *the difference in the range as claimed and any of the phosphors taught by Ellens et al, is critical to their invention*, and, most particularly, Applicants do not even state what the *tolerance* of the stated values for n and m in the range limitation is. In view of the absence of a teaching why a range is critical to the invention Applicant

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is reminded that it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

On claim 15: Ellens et al also teach the light emitting apparatus wherein the phosphor is represented by $\text{La}_{1-x}\text{Si}_3\text{N}_5:\text{Ce}_x$, where $0 < x < 1$ and the cerium ion is doped to the lanthanum site in solid dissolution replacement (of the lanthanum ion) (cf. col. 2, l. 6-64, specifically, l. 64, with $x=0.5$). In this regard the objection to claim 15 is noted above.

On claim 16: the doping amount is $x=0.5$, which is a limit point of the claimed range $0.1 < x < 0.5$, and therefore the phosphor also is an ultraviolet ray excitation phosphor, differing from the prior art only by an infinitesimal amount (amount smaller than any given positive amount). In this regard Applicant is reminded that it has been held that a *prima facie* case of obviousness typically exists when the ranges of a claimed composition overlap the ranges disclosed in the prior art or when the ranges of a claimed composition do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties. In re Peterson, 65 USPQ2d 1379 (CA FC 2003).

On claim 18: the phosphor by Ellens radiates daylight and hence also blue light, blue light being part of daylight (cf. col. 1, l. 49 – col. 2, l. 64).

5. **Claims 19, 21, 23 and 25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellens et al (6,670,748 B2) in view of Lebens et al (6,095,661). Ellens et al teach a light emitting method for a light emitting apparatus that comprises a light

emitting element (cf. title and abstract) with an emission wavelength in the range of 300 to 570 nm, hence a range overlapping the range as claimed in claims 19 and 23 (cf. abstract); and a rare– earth element doped oxide nitride phosphor (cf. col. 1, l. 39 – col. 4, l. 5, for instance col. 3, l. 41) including the rare-earth element Ce (cf. especially col. 3, l. 41), wherein part of the light radiated from the light emitting element is wavelength-converted by the phosphor so that the light-emitting element radiates light generated by a mixture of wavelength-converted light and the other part of light from the light emitting element (to the wavelength range with peak emission at 430 to 670 nm for example: see abstract). In conclusion, Ellens et al teach all limitations except possibly the two following limitations:

(a) the range for the emission wavelength, said range seen to overlap the range taught by the prior art. However, Applicants are reminded that a *prima facie* case of obviousness typically exists when the ranges as claimed overlap the ranges disclosed in the prior art or when the ranges do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties. In re Peterson, 65 USPQ2d 1379 (CA FC 2003);

(b) the turning on intermittently the light emitting element. However, it would have been obvious to include limitation ad (b) in view of Lebens et al (see final sentence in abstract, Figure 9 and col. 13, l. 15-40), who teach the selective application of power (pulsed signals characterized by a certain frequency with feedback control) to LEDs of InGaN (hence analogous art) thus making use of the temperature-dependent color spectrum of said LED to control the spectrum (hence meeting claim 21). *Motivation to*

include the teaching by Lebens et al thus derives from the added control of the light spectrum.

On claim 25: the light element comprises a Group III nitride system compound semiconductor light emitting element (InGaN) (cf. Best Mode for Carrying out the Invention in Ellens et al).

6. **Claims 20, 22, 24 and 26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellens et al (6,670,748 B2) in view of Lebens et al (6,095,661). Ellens et al teach a light emitting method for a light emitting apparatus that comprises a light emitting element (cf. title and abstract) with an emission wavelength in the range of 300 to 570 nm, hence a range overlapping the range as claimed in claim 20 as well as in claim 24, i.e., the claimed ranges 360 to 550 nm and 450-550 nm (cf. abstract); and a lanthanum silicon nitride phosphor (cf. col. 1, l. 39 – col. 4, l. 5, for instance col. 3, l. 41) including the rare-earth element Ce (cf. especially col. 2, l. 64), wherein part of the light radiated from the light emitting element is wavelength-converted by the phosphor so that the light-emitting element radiates light generated by a mixture of wavelength-converted light and the other part of light from the light emitting element (to the wavelength range with peak emission at 430 to 670 nm for example: see abstract). In conclusion, Ellens et al teach all limitations except possibly the two following limitations:

(a) the range for the emission wavelength, said range seen to overlap the range taught by the prior art. However, Applicants are reminded that a *prima facie* case of obviousness typically exists when the ranges as claimed overlap the ranges disclosed in the prior art or when the ranges do not overlap but are close enough such that one

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skilled in the art would have expected them to have the same properties. In re Peterson, 65 USPQ2d 1379 (CA FC 2003);

(b) said method comprising the turning on intermittently the light emitting element. However, it would have been obvious to include limitation ad (b) in view of Lebens et al (see final sentence in abstract, Figure 9 and col. 13, l. 15-40), who teach the selective application of power (pulsed signals with feedback control and characterized by a frequency) to LEDs of InGaN (hence analogous art) thus making use of the temperature-dependent color spectrum of said LED to control the spectrum (col. 13, l. 15-40; hence meeting claim 22). *Motivation* to include the teaching by Lebens et al thus derives from the added control of the light spectrum.

On claim 26: the light element comprises a Group III nitride system compound semiconductor light emitting element (InGaN) (cf. Best Mode for Carrying out the Invention in Ellens et al).

Allowable Subject Matter

7. ***Claims 12 and 13*** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The further limitation of claim 12, within the strict context of the invention as claimed by claim 1, has not been found in the prior art. Closest prior art is Mimoto et al (6,776,927 B2), Mimoto et al (6,632,379 B2); however, neither double patenting nor a rejection under 102(e) appears possible

because the limitation to 90% in weight or less for the alpha-sialon as claimed is not found herein.

8. **Claim 17** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The further limitation of claim 17, within the strict context of the invention as claimed by claim 14, has not been found in the prior art. Although Mimoto et al (6,776,927 B2) and Mimoto et al (6,632,379 B2) teach a phosphor excitable by electron beam said phosphor said phosphor is not cerium-doped.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P. Mondt whose telephone number is 571-272-1919. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NATHAN J. FLYNN
SUPERVISOR
TECHNOLOGY CENTER

JPM

July 17, 2005